Certificate no.:
TAM00001D5

TYPE APPROVAL CERTIFICATE

This is to certify:

that the Turbocharger

with type designation(s)
MET42MBII, MET48MBII, MET66MBII

issued to
MITSUI E&S CO., LTD.
Tamano, Okayama Pref., Japan

is found to comply with
DNV rules for classification – Ships Pt.4 Ch.3 Sec.1 Reciprocating internal combustion engines

Application:

Products approved by this certificate are accepted for installation on all vessels classed by DNV.

Issued at **Høvik** on **2024-05-07**
This Certificate is valid until **2029-05-06**.
DNV local unit: **Japan CMC**

for **DNV**

Approval Engineer: **Tage Olav Alexander Strøm**

This Certificate is subject to terms and conditions overleaf. Any significant change in design or construction may render this Certificate invalid.
The validity date relates to the Type Approval Certificate and not to the approval of equipment/systems installed.

LEGAL DISCLAIMER: Unless otherwise stated in the applicable contract with the holder of this document, or following from mandatory law, the liability of DNV AS, its parent companies and their subsidiaries as well as their officers, directors and employees ("DNV") arising from or in connection with the services rendered for the purpose of the issuance of this document or reliance thereon, whether in contract or in tort (including negligence), shall be limited to direct losses and under any circumstance be limited to 300,000 USD.

Product description
Exhaust driven turbochargers served by cylinder groups with combined power in the range of 5600kW-23100kW [1].

Place of production
MITSUI E&S Co., Ltd., Tamano, Japan

Application/Limitation

Type	MET42MBII		MET48MBII	
Impeller type	2	3	2	3
Impeller tip dia.[mm]	462		524	
Max rated speed (RPM)	23310		20550	
Engine power range [kW] [1]	5600-9300		7200-11900	
Max temperature (^{0}C)	580			
Max. Pressure Ratio	5.0			

Type	MET66MBII	
Impeller type	2	3
Impeller tip dia.[mm]	730	
Max rated speed (RPM)	14750	
Engine power range [kW] [1]	14000-23100	
Max temperature (^{0}C)	580	
Max. Pressure Ratio	5.0	

[1] Engine power range is the reference values subject to pressure ratio of 4.0

Alarm levels:
Overspeed, maximum alarm level: 105% of maximum rated speed

High exhaust temperature at turbine entry, maximum alarm level: 550 ºC

Low lubrication oil pressure at turbocharger inlet, minimum alarm level: 0.6 bar (gauge pressure)

Maximum lubrication oil outlet temperature (alarm level): 90 ºC

Application constraints:
Maximum allowed inclinations for MET turbochargers:
Static: ± 15º and Dynamic (momentary): ± 22.5º
Engine and rotor vibrations to be within specifications for MET turbochargers (ref. Tz-E002-6097, dated 2019/2/28).

Type Approval documentation
As listed in our reference “M-KJ-CMC/TOAS/262.1-040800-J-7”

Tests carried out
Type Approval test report of MET33MBII, dated 27 September 2019, drawing number : Tz-E002-6248,
Type Approval test of MET42MBII performed 14 December 2021, ref FB3F49WMCE55K1

Marking of product
The product to be marked with manufacturer’s name or trademark and type number identification.

Periodical assessment
For retention of the type approval, a DNV surveyor shall perform an assessment after 2 years and after 3.5 years, both referring to the issue date of the type approval certificate to verify that the conditions of the type approval are complied with. A renewal assessment will be performed at renewal of the certificate.

In cases where the type approved product is manufactured at other companies, the periodical assessment shall verify that the type approval applicant has a quality control system for consistent production at their licensees/subcontractors. Furthermore, periodical assessment shall be carried out randomly at these companies.

END OF CERTIFICATE